

the 8th, at Des Moines, Iowa; 9th, in vicinity of Dubuque, Iowa; 18th, in vicinity of Pittsburgh; 19th, in Nodaway river, eastern Missouri; 21st, Forrest county, Penn.; 24th, in the Pedee river, at Albemarle, N. C.; on the 25th, at Weldon, N. C., the Roanoke river was high.

RELATIVE HUMIDITY.

The mean relative humidity for the month, as reported from the Signal Service stations, ranges in New England from 69 to 75 per cent; Middle Atlantic States, 68 to 78; South Atlantic States, 70 to 78; Gulf States, (excepting Florida,) Tennessee, Arkansas and Indian Territory, 59 to 70; Lake region, 71 to 78; Ohio valley and Northwest, 66 to 76; Pacific coast, 71 to 77. It is, as usual, lowest at the Rocky Mountain stations, being 66 at Pike's Peak, 56 at Santa Fe, 41 at Denver and Virginia City, 40 at Cheyenne and 30 at Salt Lake City; the mean for Mt. Washington is 87; all uncorrected for altitude of stations.

WINDS.

Prevailing Winds.—The most frequent winds are shown by the arrows on chart No. II, and have been NW. in the central portion of the country between the Rocky and Alleghany Mountains, except S. in western Texas, Kansas and Nebraska; NE. and SW. winds have been pretty equally felt along the Atlantic coast.

Highest Winds.—Among the highest wind-velocities reported from the Signal Service Stations for the month, are the following: Cape Hatteras and Cape Lookout, (estimated, anemometer being broken), 17th, SE., 100 miles per hour; Kitty Hawk, 17th, S., 90; Cape Henry, SE., 78; New River, NC., 17th, NW., 75; Barnegat, E., 64; Wilmington, 17th, NW., 56; Norfolk, 17th, SE., 55; Atlantic City, 17th, E., 52; Philadelphia, 17th, 52; Sandy Hook, 17th, NE., 52; Mt. Washington, 90; Fort Gibson, 19th, W., 52; Pike's Peak, 8th, 49; Cape May, 17th, SE., 65.

Total Movements of the Air.—The following are the largest total movements of the air during the month, recorded at Signal Service stations: Cape May, 11,778 miles; Sandy Hook, 11,406; Barnegat, 11,027; Pike's Peak, 10,829; Cape Lookout, 10,247; Dodge City, 9,871; Cape Henry, 8,755; Breckenridge, 8,208; North Platte, 8,169; Philadelphia, 8,143; New York, 8,022. The smallest movements are: Vicksburg, 1,836; Augusta, 2,135; Savannah, 2,184; Nashville, 2,216; Lynchburgh, 2,310; Shreveport, 2,507; Portland, Or., 2,712; Montgomery, 2,920. These figures indicate the prevalence of highest winds on the Atlantic coast, from North Carolina to New Jersey, and also on the northwestern plains and the prevalence of feeblest winds in interior of the Southern States.

VERIFICATIONS.

Probabilities.—The comparison of the tri-daily published Probabilities with the telegraphic reports received during the succeeding twenty-four hours gives the following results: The percentage of verifications has averaged for New England, 83.4; Middle States, 87.1; South Atlantic States, 80.1; Eastern Gulf States, 84.4; Western Gulf States, 83.8; Tennessee and Ohio valley, 85.5; Lower Lake region, 85.1; Upper Lake region, 81.5; Upper Mississippi valley, 79.8; Lower Missouri valley, 76.95. The average for the whole country is 82.8 per cent. The general average for the respective elements is: For the Weather, 85.7; Direction of Wind, 83.8; Temperature, 79.2; Barometric Changes, 82.5. There were 31, or 0.86 per cent., omissions to predict.

Cautionary Signals.—During the month, 125 Cautionary Signals were ordered to be displayed at the Service Station stations on the Lakes, Gulf and Atlantic coasts. Of these, 3 were ordered late, 27 were reported not justified, and 95, or 76 per cent., were fully justified by high winds near the respective stations. Forty-three cases are reported of winds exceeding 25 miles, for which no Cautionary Signals were ordered.

NAVIGATION.

Height of Rivers.—The table on Chart No. III. gives the highest and lowest readings at the Signal Service river-gauges. The Red River and the Missouri, above Omaha, have experienced a steady decline. The lower Missouri, the Mississippi and Ohio have been occasionally swelled by the rains. The Ohio was highest from the 19th to 24th, and the Mississippi at Cairo rose pretty steadily from the 3rd to 21st, and at Memphis from the 5th to 23rd. At Keokuk, the river very nearly reached the "danger-line" on the 10th, and the Ohio rose slightly above "danger-lines" on the 19th at Pittsburgh, and 23rd at Cincinnati.

The Signal Service Observers report that the east winds attending the hurricane of the 16th and 17th, caused unusually high water along the Atlantic coast; at Atlantic City, N. J., the highest water was reported on the 17th; at Pembina, Dak., the Red river of the north was unusually low during the latter part of the month; at Pittsburgh, Pa., the river was very low from the 1st to 9th, it rose rapidly on the 10th, when navigation was resumed. The voluntary observers report as follows. The water in Lake Michigan was extremely high on the 30th at North Point, Mich. The Connecticut river has been lower than ever before known: at Westminster, Vt., it was lowest on the 7th.

TEMPERATURE OF WATER.

As heretofore, the maximum and minimum temperatures, at or near the bottom, with the average depth of water, are given in the table on the lower right-hand corner of chart No. III. The *smallest ranges*

are: 2' at Eastport, 4' at Portland, 5' at Cleveland; and the *greatest* are 20' at Norfolk and St. Paul, 21' at Keokuk, 19' at La Crosse and Duluth. The *highest maxima* are 90 at Key West, 89° at Jacksonville, 83° at Montgomery, 87° at Mobile and Savannah, 85° at Augusta. The *lowest minima* are 48° at La Crosse, 49° at Eastport, 50° at Duluth.

ATMOSPHERIC ELECTRICITY.

Thunder-storms—have been reported as follows: September 1st, Col., Ga., Ill., Ind., Kan., La., Mass., Me., Miss., Mo., N.H., N. Y., Ohio, Penn., Tenn., Texas, Vt.; 2nd, Ala., Col., Dak., Ga., Kan., La., Me., Miss., Neb., N. Y., Penn., Texas, S. C.; 3rd, Fla., Ga., Ill., Iowa, Kan., Mich., Miss., Mont., Neb., Wis.; 4th, Col., Dak., Ga., Ill., Ind., Iowa, Kan., Me., Miss., Neb., N. H., Ohio, Penn., Utah; 5th, Ill., Ind., Iowa, Kan., Mo., Miss., Neb.; 6th, Dak., Ill., Iowa, Kan., Neb., N. C., Penn., Va.; 7th, Ill., Ind., Iowa, Kan., Neb., N. C., Ohio, Va.; 8th, Conn., Dak., Del., Ind., Ill., Iowa, Kan., Miss., Neb., N. H., N. Y., Ohio, Vt., Va.; 9th, Ark., Ill., Ind., Iowa, La., Mich., Mo., Ohio, Tenn., Tex., Wis., Ind. Ter.; 10th, Ala., Fla., Ga., Miss., Ohio, Tenn., S. C., N. C., Penn., W. Va.; 11th, Ala., Fla., Ga., Kan., Miss., Neb., N. Y., N. C., S. C.; 12th, Ga., Kan., Neb., N. C., S. C.; 13th, Ga., Ind., Kan., Mich., Ohio; 14th, Del., D. C., Fla., Ga., Md., Mich., N. J., N. Y., N. C., Ohio, Penn., Va., W. Va.; 15th, Ga., Me., M. T., N. Y., N. J., Penn., Vt.; 16th, Kan., Neb., N. J., N. Y., S. C., Utah; 17th, Iowa, Kan., Neb., N. C.; 18th, Kan., Minn., Neb., Texas; 19th, Ind. Ter.; 20th, Ill., Mich., Miss., N. C., Tenn.; 21st, Ala., Ga., Ind., N. C., Ohio, Tenn.; 22nd, Minn., N. Y., Ohio; 23rd, Del., Ind., Iowa, Mich., N. C., S. C., Va.; 24th, Da., Iowa, Minn., Neb.; 25th, Ill., Ind., Iowa, Ohio, Pa., Tenn., Wis.; 26th, Mich., Miss.; 27th, Col., Iowa, Neb.; 28th, Ill., Kan., Mich., Neb., Ind. Ter.; 30th, N. C.

Auroras—The principal Auroras have been those of the 13th, 22d, 25th and 26th—they have been observed as follows: On the 13th, Me., Mass., N. Y., Dak., N. H., Vt.; 14th, Ind., Vt., Mich.; 15th, Dak.; 16th, Kan.; 18th, N. Y.; 22nd, Me., Mass., Mich., M. T., N. H., N. Y., Vt., Dak., R. I.; 23rd, Dak., Ohio, Minn.; 24th, Iowa; 25th, Dak., Iowa, Me., Mass., Mich., N. Y., Minn.; 26th, Iowa, Mich., N. Y., Ohio, Dak., Ill., Minn., Mass., Wis.; 27th, N. Y., Ohio, N. J.; 28th, Dak., N. Y.

Solar Halos were observed on the 1st in Ohio, Ill.; 3rd, Ohio, S. C., Mich.; 4th, Iowa, Vt., S. C.; 5th, Ohio, Vt., Va., Wis., D. C.; 6th, N. Y., Ohio, N. J., D. C.; 7th, N. Y.; 8th, Ohio, Tenn., Mich.; 9th, R. I.; 10th, Me., Mass., N. H., N. Y., Ohio; 11th, Ohio, S. C.; 12th, Kan., Ga.; 13th, Ind., Tenn.; 14th, N. C., Me.; 15th, Mich.; 16th, Conn., Me., Mass., N. H., N. Y., Ohio, Tenn., Mich.; 17th, N. H., Tenn., N. Y.; 18th, Ohio, Iowa, Minn.; 19th, Kan.; 20th, Ind., Ohio, Va., W. Va., S. C., Wy. T., Mich., Ga.; 21st, Ohio, S. C.; 22nd, N. C.; 23rd, Conn., Me., Mass., N. H.; 24th, N. H., Me., La.; 25th, Ohio, Tenn., Mich.; 26th, N. M.; 27th, Ind., Mich., Wis.; 28th, Tenn., Vt., S. C., Dak.; 29th, Conn., N. H., N. Y., N. J., Col., Me., R. I., Ga.; 30th, Miss., S. C.

Lunar Halos.—1st, in N. J., Ill., Tenn., N. C.; 2d, Penn., Mo., Ga.; 3d, Me., S. C., N. C., Mo., Mass., Ga., Miss., Ind., Penn.; 4th, Minn., Mich., Iowa, Ala., N. C., Mo., La., Dak. T., Kan., Ohio, Wis.; 5th, Ohio, Mich., Kan., W. Va., Ala., Va., N. C., N. M., D. C., Ind.; 6th, N. Y., N. J., Mass., Conn., N. C., Me., Tenn.; 7th, N. C., N. J., Tenn.; 8th, N. C., Mo., Ohio; 23d, Tenn.; 24th, Ga., Me., N. C., Miss., Tenn.; 25th, N. J., N. I., Mo., N. M., Miss., Tenn.; 26th, Minn., Ohio, Tenn.; 27th, Minn., Me., Dak. T., Fla., N. C., Mo.; N. H., N. Y., Tenn.; 28th, Ga., S. C., N. C., Ill., Dak. T., Conn., Neb., Mo., Va., Kan., Minn., Tenn.; 29th, S. C., Ohio, Col., Ala., N. C., Fla., Conn., Ill., Mass., N. H., N. J., N. Y., Tenn., Wis.; 30th, Mich., Fla., Ala., Ind., Minn.

Mirage was observed at Great Bend, Kansas, on the 15th, 21st, 26th, 27th, 29th and 30th; New London, Conn., 5th, 11th, 13th, 19th, 20th and 21st; Gybee Island, 12th; Breckenridge, Minn., 4th, 7th and 25th.

MISCELLANEOUS PHENOMENA.

Zoological.—*Geese* were seen at Lower Brule Agency, Dak., 19th, 20th, 25th, 27th; Hennepin, Ill., flying SW., 29th; at Rockford, Iowa, flying S., 26th; Burlingame, Kan., flying S., 27th; Great Bend, Kan., arrived on 20th; Clear Creek, Nebraska, flying south, 20th; Richmond, Nebraska, flying south, 19th; Bismarck, Dakota, flying south, 27th; Duluth, flying south, 29th; Dubuque, Iowa, flying south, 16th and 28th; Fort Sully, Dak., flying south, 20th to 23rd; Keokuk, Iowa, flying south, 21st; Pembina, Dak., flying SE., 23rd. *Ducks* were seen at Lower Brule Agency, Dak., flying S., 15th, 18th, 22nd; Clear Creek, Neb., flying S., 18th. *Cranes* seen at Great Bend, Kan., flying S., 19th; Bismarck, Dak., flying S., 27th and 28th; Breckenridge, Minn., flying S., 12th and 15th. *Swallows* last seen at Somerset, Mass., on 23rd; left Fall River, Mass., 17th; Chimney Swallows last seen at Contoocookville, N. H., on 19th, and Barn Swallows last seen on the 6th; Swallows last seen at Wappinger's Falls, N. Y., on 16th. *King Bird*, Contoocookville, N. H., last seen on the 14th. *Robins* left Urbana, Ohio, 16th. *Blackbirds* were seen at Golden City, Cal., flying S., on the 30th; at Sedgewick, Kan., flying S., 20th; Urbana, Ohio, left on the 25th. *Plover* seen at Sedgewick, Kan., flying S., 20th, and *Blue-jays* seen at Sedgewick, Kan., 21st. *Wild Pigeons* were seen at Jacksonsburg, Ohio, flying NW., 3rd. *Grasshoppers*, flying NE., on 8th, at Fort Garland, Col.; flying N. at Fort Wallace, Kan., 4th; flying, at Fort Richardson, Texas, from 14th to 18th; at Golden, Col., flying E-SE., 2nd and 4th, flying NW., 6th, flying W. and NW., 15th, flying E-SE., 23rd, flying NW., 25th; Burlingame, Kan., in large numbers, 9th, 10th, 11th, 15th, 20th, 21st; Le Roy, Kan., arrived on the 9th;